

NON-PUBLIC?: N  
ACCESSION #: 9101310179  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Braidwood Unit 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000456

TITLE: Reactor Trip Caused By Main Generator Phase C Ground Fault  
EVENT DATE: 12/30/90 LER #: 90-023-00 REPORT DATE: 01/24/91

OTHER FACILITIES INVOLVED: NONE DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 098

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Dale Nelson, LER Coordinator TELEPHONE: (815) 458-2801  
Ext. 2497

COMPONENT FAILURE DESCRIPTION:  
CAUSE: X SYSTEM: TB COMPONENT: GEN\* MANUFACTURER: W120  
REPORTABLE NPRDS: YES

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On December 30, 1990, Unit 1 was load following to accommodate system demand for the Commonwealth Edison Company system load dispatcher. At 0815 the Unit completed a power ascension to full capability. At 0821 a Generator Neutral Ground Overcurrent protective relay actuated and tripped the Unit 1 Main Generator. A turbine and reactor trip followed as designed. Megger testing revealed a ground on the "C" phase of the Main Generator. The cause of the ground was an internal generator defect. The generator vendor, Westinghouse, was contacted to provide assistance in locating the fault. Upon application of Hi Potential Alternating Current to the "C" Phase, observation of smoke and electrical arcing revealed that the fault was in the bottom coil in slot 29 of the stator. Damage to the coil was attributed to a vent spacer that came loose. Vibration during normal operation allowed the spacer to rub and wear down insulation protecting the coil. The ground was created as a result of insulation breakdown. The coil was removed from

the stator and sent to the vendor. This component failure is considered to be an isolated event. There have been previous occurrences of a reactor trip caused by a generator trip. Previous corrective actions and contributing root cause are not applicable to this event.

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END OF ABSTRACT

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A. Plant Conditions Prior to Event:

Unit: Braidwood 1; Event Date: December 30, 1990; Event Time: 0821;  
Mode: 1 - Power Operation; Rx Power: 098%;  
RCS AB! Temperature / Pressure: NOT / NOP;

B. Description of Event:

There were no systems or components inoperable at the beginning of the event which contributed to the severity of the event.

On December 30, 1990, Unit 1 was load following to accommodate system demand for the Commonwealth Edison Company system load dispatcher. At 0815 the Unit completed a power ascension to full capability. At 0821 a Generator Neutral Ground Overcurrent protective relay actuated and tripped the Unit 1 Main Generator (TG) TB!. A turbine and reactor trip followed as designed. All control rods fully inserted and due to the turbine trip at high power, steam generator (MS) SB! levels shrunk to the lo-lo level setpoint. Both Auxiliary Feedwater (AF) BA! pumps auto-started as designed to restore steam generator level.

On-site power supply disturbances, caused by the Main Generator Trip, were sensed by Area Radiation (AR) IL! monitors located inside Containment and the Fuel Handling Building. The monitors in Containment generated a Containment Ventilation (VQ) VA! Isolation Actuation Signal. No components repositioned as all were in their required isolation position. The Fuel Handling Building radiation monitor initiated an automatic start of the fuel Handling Building Charcoal Booster Fan (VA) VG!. These monitors responded as designed on a momentary loss of power.

All other systems functioned as designed. Operators performed applicable steps of the reactor trip response procedures to stabilize the plant. Auxiliary feedwater was secured after steam generator levels were restored to their normal operating level. Upon

verification that high radiation levels did not exist, the Containment Ventilation Isolation Actuation Signal was reset, and the fuel Handling Building Ventilation was restored to a normal lineup.

The appropriate NRC notification via the ENS phone system was made at 0955 pursuant to 10CFR50.72(b)(2)(ii).

Initially, there was difficulty isolating the Main Power (MP) EL Transformers (MPT) because the Main Generator disconnect linkage had frozen. Outside air temperature had dropped below 10 degrees F after a rainstorm on the previous day. This situation was corrected and the MPT's were isolated.

At 1029 stable plant conditions were achieved and operators exited the Braidwood Emergency Procedure (BwEP) ES-0.1, Reactor Trip Response, and entered Braidwood General Procedure (BwGP) 100-5, Plant Shutdown and Cooldown.

This event is being reported pursuant to 10CFR50.73(a)(2)(iv) - any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

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#### C. Cause of Event:

Inspection of Generator protection relays identified that the ground overcurrent relays had tripped on the MPT's. The Generator disconnect links were removed to allow testing / troubleshooting of the Main Generator separate from the transformers. Testing of the transformers indicated that they had functioned correctly. Megger testing revealed a ground on the "C" phase of the Main Generator. The cause of the ground was an internal generator defect. The generator vendor, Westinghouse, was contacted to provide assistance in locating the fault.

The cause of the Containment Ventilation Isolation Actuation Signal was a momentary loss of power to the containment fuel handling incident radiation monitors.

The auto start of the Fuel Handling Building Charcoal Booster Fan was a momentary loss of power to the fuel handling building incident radiation monitors.

#### D. Safety Analysis:

Plant and public safety were not affected. The generator neutral ground overcurrent relay isolated the generator from the system grid. Redundant trains of reactor protection (RP) JG! and engineered safety features (EF) JE! were operable, available and effective in performing their design functions.

Under the worst case condition, if a generator fault caused a total loss of offsite power, emergency diesel generators (DG) EK! would supply the EF electrical power requirements. This event is analyzed in Section 8 of the Updated Final Safety Analysis Report.

#### E. Corrective Actions:

The Main Generator was disassembled and the rotor was removed to locate the ground. Upon application of Hi Potential Alternating Current to the "C" Phase, observation of smoke and electrical arcing revealed that the fault was in the bottom coil in slot 29 of the stator. Damage to the coil was attributed to a vent spacer that came loose. Vibration during normal operation allowed the spacer to rub and wear down insulation protecting the coil. The ground was created as a result of insulation breakdown. The coil was removed from the stator and sent to the vendor. This component failure is considered to be an isolated event.

After replacement of the defective coil, the generator will be reassembled. The Unit is scheduled to return to service in late February 1991.

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#### F. Previous Occurrences:

There have been previous occurrences of a reactor trip caused by a generator trip. Previous corrective actions and contributing root cause are not applicable to this event.

#### G. Component Failure Data:

Manufacturer Nomenclature Model Number MFG Part Number

Westinghouse Generator 83P721 1313F19  
Stator Coil

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Commonwealth Edison  
Braidwood Nuclear Power Station  
Route #1, Box 84  
Braceville, Illinois 60407  
Telephone 815/458-2801

January 29, 1991  
BW/91-0083

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D. C. 20555

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv) which require a 30-day written report.

This report is number 90-023-00; Docket No. 50-456.

Very truly yours,

K. L. Kofron  
Station Manager  
Braidwood Nuclear Station

KLK/DN/clf  
(226/ZD85G)  
Enclosure: Licensee Event Report No. 90-023-00

cc: NRC Region III Administrator  
NRC Resident Inspector  
INPO Record Center  
CECo Distribution List

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